

Tunable phononic lens for deep tissue imaging

Paper 10494-138

Time: 5:30 PM - 7:00 PM

Author(s): Delfino Reyes Contreras, Univ. Autónoma del Estado de México (Mexico), Univ. of North Texas (United States); Ezekiel Walker, Arup Neogi, Univ. of North Texas (United States)

A phononic crystal was designed to realize a phononic lens (PnL), formed either by stainless steel structure or air-filled plastic rods (fabricated using 3D printing technology) as scatterers in water environment. The PhL was made active infiltrating a thermoelastic polymer-PVA within the scatterers. Simulations revealed that the focusing occurs in the first transmission band (100-300 kHz). Experimental results demonstrate focusing at 218.4 kHz. The focal length of the polymer-hybrid PhL, can be tuned from 55 mm to 30 mm by changing the temperature from 20 °C to 39 °C. This is the first demonstration of an all-acoustical tunable PnL without any electromechanical component.